

The waterbirds and coastal seabirds of Timor-Leste: new site records clarifying residence status, distribution and taxonomy

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The status of waterbirds and coastal seabirds in Timor-Leste is refined based on surveys during 2005–2010. A total of 2,036 records of 82 waterbird and coastal seabirds were collected during 272 visits to 57 Timor-Leste sites, and in addition a small number of significant records from Indonesian West Timor, many by colleagues, are included. More than 200 new species by Timor-Leste site records were collected. Key results were the addition of three waterbirds to the Timor Island list (Red-legged Crake *Rallina fasciata*, vagrant Masked Lapwing *Vanellus miles* and recent colonist and Near Threatened Javan Plover *Charadrius javanicus*) and the first records in Timor-Leste for three irregular visitors: Australian White Ibis *Threskiornis molucca*, Ruff *Philomachus pugnax* and Near Threatened Eurasian Curlew *Numenius arquata*. Records of two subspecies of Gull-billed Tern *Gelochelidon nilotica*, including the first confirmed records outside Australia of *G. n. macrotarsa*, were also of note.

INTRODUCTION

Timor Island lies at the interface of continental South-East Asia and Australia and consequently its resident waterbird and coastal seabird avifauna is biogeographically mixed. Some of the most notable findings of a Timor-Leste field survey during 2002–2004 were the discovery of resident breeding populations of the essentially Australian Red-capped Plover *Charadrius ruficapillus*, and the first island records of two rails (Spotless Crake *Porzana tabuensis* and Red-necked Crake *P. fusca*) at the limits of their Australian and South-East Asian distributions respectively (Trainor 2005a). A total of ten new waterbird and coastal seabirds including three ducks, three rails, painted snipe, two migrant waders, a tern and a night-heron were added to the island list (Trainor 2005a). For many species there was still limited information to determine their residence status, and taxonomic status, particularly subspecific identity. Three wetlands were identified as of high national significance, with Lake Iralaloro on the Fuiloro plateau one of the most notable wetlands in Wallacea.

Here I provide new information on the status and distribution of waterbirds in Timor-Leste, and Timor generally, based on field surveys from January 2005 to October 2010 and, where appropriate, the incorporation of previous data. It marks the culmination of a

number of field projects in Timor-Leste, including an Important Bird Areas programme and a doctoral study (Trainor *et al.* 2007a, Trainor 2010). The residence status and nomenclature for some species listed in a fieldguide (Trainor *et al.* 2007b) and recent review (Trainor *et al.* 2008) are clarified. Three new island records are documented and substantial new ecological data on distribution and habitat use are included. Errors and omissions in Trainor (2005a) are also corrected or updated.

METHODS

Waterbirds and coastal seabirds were recorded in Timor-Leste during visits to 57 wetland sites, including 19 new sites not covered in Trainor (2005a), during 11 April 2005 to 26 September 2010 (Table 1).

A few significant observations of waterbirds and coastal seabirds from Indonesian West Timor are also noted from the following locations. Three sites in Kupang Bay sites were visited: Olio River and adjacent fishponds on 15 December 2004 (data omitted from Trainor 2005a), 4 January 2005, 6 January 2005 and 5 January 2010, and Kuka-Pariti and Bipolo-Panmuti were visited on 5 January 2005. Extensive mangrove-lined lagoons at Tuadale (10°19'30"S

Table 1. Summary of the 19 newly surveyed Timor-Leste sites additional to the 74 sites listed in Trainor (2005a) (and numbered 1–74 in Appendix 2, and shown on Figure 1 of Trainor 2005a).

No.	Wetland site	District	Area (ha)	Elevation (m)	Habitat	Coordinates
75	Lifao River estuary	Oecusse	10	0	Braided stream estuary	9°12'18"S 124°18'29"E
76	Oecussi swamp	Oecusse	200	1	Mangrove lined floodplain and short grass	9°12'04"S 124°21'24"E
77	Lake Onu Laran	Covalima	30	2	Freshwater lake (reedbed-lined)	9°25'22"S 125°07'06"E
78	Lake Asan Foun	Covalima	5	1	Saline coastal lagoons	9°24'29"S 125°11'08"E
79	Maliana ricefields	Bobonaro	300	210	Ricefields	8°58'54"S 125°12'09"E
80	Suai airfield	Covalima	100	21	Short grass	9°18'13"S 125°17'09"E
81	Queorema dam (Hatu Builico)	Ainaro	0.3	2,110	Shallow saline lake	8°51'46"S 125°32'01"E
82	Mount Manucoco, Makadade	Dili	600	600	Springs on mountain	8°16'10"S 125°34'24"E
83	Lake Welada	Manufahi	7	42	Freshwater lake, mangrove-lined	9°01'26"S 125°59'06"E
84	Lake Welenas	Manufahi	12	44	Freshwater lake, mangrove-lined	9°01'36"S 125°58'14"E
85	Sahen River channel	Manatuto	300	30	Braided stream channel	9°00'25"S 126°00'58"E
86	Lake Naan Kuro	Manatuto	100	0	Saline coastal lagoon, mangrove-lined	9°01'53"S 126°05'13"E
87	Manatuto Lake/ mangroves	Manatuto	24	0	Saline mudflats	8°31'34"S 126°04'20"E
88	Laleia River	Baucau	200	20	Braided stream channel	8°33'44"S 126°10'08"E
89	Carabella	Baucau	100	5	Short grass, ricefields	8°28'58"S 126°16'56"E
90	Parlemento-Moro	Lautem	100	0	Beach, coastal	8°19'30"S 126°58'54"E
91	Nari	Lautem	1,500	580	Short grass	8°24'17"S 126°58'07"E
92	Chin River	Lautem	20,000	360	Secondary forest, springs	8°33'28"S 126°56'54"E
93	Fuiloro	Lautem	500	420	Short grass	8°24'18"S 126°57'58"E

124°13'27"E), c. 15 km south of Kupang, were visited on 6 January 2005, and a dam near Nenas village (9°36'39"S 124°13'27"E) at 1,760 m, in the foothills of Mount Mutis (see Noske in Jepson & Ounsted 1997) was visited on 5 January 2010.

Taxonomy and nomenclature follows Oriental Bird Club (OBC) (<http://www.orientalbirdclub.org/publications/checklist>) except Australasian Darter *Anhinga novaehollandiae* which is recognised here as a species following Christidis & Boles (2008). Global threat status follows IUCN (www.redlist.org). A small number of significant observations made by colleagues in Timor-Leste, and also West Timor are included. The results focus on the interpretation of residence status of waterbirds and coastal seabirds based on their abundance, seasonality and direct or indirect breeding observations. Information on abundance (maximum counts) and habitat use, including new elevation limits, are also summarised where it differs from published information.

Correction and update

Appendix 2 of Trainor (2005a) numbers two wetlands (Lake Selo and Lake Tasitolu) as site number 13. Lake Tasitolu is site 13, and Lake Selo should be site number 14. This correction is important to enable correct interpretation of the occurrence of waterbird and coastal seabirds by sites in Appendix 1 of Trainor (2005a).

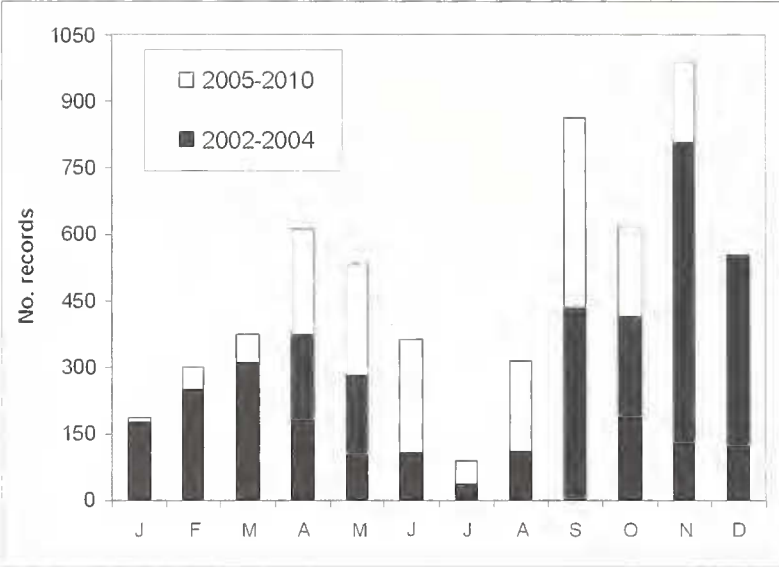
A total of 43 videos of Timor-Leste waterbirds and coastal shorebirds shot during 2003–2005 were uploaded to Youtube (<http://www.youtube.com/user/TheCRTrainor>). This includes the first Timor Island records of Masked Lapwing *Vanellus miles*, Pectoral Sandpiper *Calidris melanotos* and Spotted Redshank *Tringa erythropus*.

The specimen of Ruddy-breasted Crake *Porzana fusca* mentioned in Trainor (2005a) was a female, and was lodged at the Australian Museum as specimen: O.72283 (tissue number is 46545: W. Boles, *in litt.* 2010).

RESULTS

A total of 2,036 records of 82 waterbird and coastal seabird species were obtained in Timor-Leste during 283 visits to 57 wetland sites over 185 field days. This included a total of 227 new species by site records (Appendix 1). Two additional species (Asian Dowitcher *Limnodromus semipalmatus* and Kentish Plover *Charadrius alexandrinus*) were only reported in Timor-Leste by colleagues. Records were not collected evenly, with greater effort in the late dry season (September–November) and few records during January, February, July and August (Figure 1). A set of breeding records of species not covered in the annotated list is given in Table 2. The annotated list documents 44 waterbird and coastal seabirds for

Figure 1. Monthly survey effort for waterbird and coastal seabirds in Timor-Leste (number of records) during the two survey periods.



which new records or new data are available on distribution, seasonality (months and extreme dates) and breeding for Timor-Leste or Timor Island. Accounts where data are contributed solely by colleagues or where the bird remains unconfirmed for Timor are included within square brackets.

Wandering Whistling Duck *Dendrocygna arcuata*

Large flocks of this breeding resident included 200 birds at Lake Modo Mahut on 12 June 2005, 300 at Loes River estuary on 10 September 2005 and 250 at Olio River on 15 December 2004. Previously the largest flocks recorded in Timor-Leste were the 120 birds at Lake Iralalaro (Trainor 2005a). At Chaiperi lagoon there were sets of eight and 10 chicks on 28 May 2004.

Green Pygmy-goose *Nettapus pulchellus*

Two birds were recorded at Lake Modo Mahut on 12 June 2005, otherwise all Timor-Leste records are from the Fuiloro plateau where the species was thought to be a visitor from Australia (Trainor 2005a). This duck is usually observed in pairs and is presumably a breeding resident in Timor-Leste, perhaps with occasional influxes of visitors from Australia, but confirmation is needed.

Pacific Black Duck *Anas superciliosa*

The six birds noted at a dam at 2,100 m at Queorema on 30 April 2005 comprised the highest elevation record in Wallacea (Coates & Bishop 1997). Additional breeding records included: two eggs (56.5×41.2 and 56×40.2 mm) at the edge of Lake Laga on 9 May 2005; two eggs found at Lake Iralalaro on 13 January 2004; one bird with five fledglings, and another with two fledglings at Lake Eraulu on 17 April 2005.

Table 2. Direct and indirect breeding records not mentioned in Trainor (2005a) or the main text. Refer to Trainor (2005a) for site details.

Species	Date	Notes
White-browed Crake <i>Parzana cinerea</i>	26 October 2006	Three immature from a total of 13 birds at Lake Iralalaro (Irasequiro River)
Purple Swampphen <i>Parphyria parphyria</i>	13 June 2005	Two or three downy chicks at Lake Welenas (video uploaded to Youtube)
Purple Swampphen <i>P. parphyria</i>	24 October 2006	Pair with 2 chicks at Lake Iralalaro
Dusky Moorhen <i>Gallinula tenebrasa</i>	30 October 2004	One bird with 2 young at Lake Iralalaro
Dusky Moorhen <i>G. tenebrasa</i>	13 December 2003	Eight birds noted including 2 juveniles at Lake Iralalaro (Irasequiro River)
Comb-crested Jacana <i>Irediparra gallinacea</i>	28 May 2004	One immature bird at Chaiperi swamp
Comb-crested Jacana <i>I. gallinacea</i>	13 December 2003	Six juvenile birds at Lake Iralalaro (Irasequiro River)
Comb-crested Jacana <i>I. gallinacea</i>	13 April 2005	Four chicks (c.16 cm tall) with seven adults at Lake Iralalaro
Comb-crested Jacana <i>I. gallinacea</i>	30 May 2005	Five immature birds at Lake Iralalaro
Malaysian Plover <i>Charadrius peranii</i>	1 November 2004	A juvenile bird on beach at Com
Great-billed Heron <i>Ardea sumatrana</i>	2 June 2005	Breeding display with head and bill held vertically at Lore, Namulutu estuary
Black-crowned Night-heron <i>Nycticarax nycticarax</i>	25 October 2006	One immature-plumage bird from a total of 15 birds at Lake Iralalaro (Irasequiro River)
Rufous Night-heron <i>Nycticarax caledanicus</i>	13 April 2005	Fledgling seen and videoed at Lake Iralalaro
Black Bittern <i>Dupetor flavicallis</i>	26 October 2006	One immature-plumage bird at Lake Iralalaro (Irasequiro River)

Sunda Teal *Anas gibberifrons*

The commonest duck on saline wetlands and estuaries with a highest count of c. 500 birds at Lake Be Malae on 18 June 2005. Four adult birds with six recently fledged juveniles at Tasitolu on 18 February 2006 confirms breeding on Timor. Sunda Teal is easily confused with Grey Teal *A. gracilis* because 'females and juveniles of nominate *gibberifrons* do not have the high forehead of the drakes' (Mees 2006). There were two unconfirmed reports of Grey Teal from West Timor, but photographs taken by J. Eaton of birds identified as Grey Teal have been confirmed as juvenile Sunda Teal (J. Davies *in litt.* 2010). The only published Lesser Sunda record of Grey Teal is from Komodo (Bishop 1992), but there is no description given, and this record should also be considered as unconfirmed (Mees 2006).

Hardhead *Aythya australis*

Previously considered as an Australian visitor, but with up to 100 birds at Lake Iralalaro (Trainor 2005a) and birds occasionally seen in pairs, it may be a breeding resident. Now known from sea level to 1,150 m; previously recorded to 340 m (Trainor 2005a).

[Red-legged Crake *Rallina fasciata*

The first island records were of a pair of adult birds with two well-feathered chicks observed at Bipolo, West Timor, on 5 February 2009, and an adult bird seen at Camplong, West Timor, on 9 February 2009 (Dymond 2011); subsequently an adult bird was seen independently by three observers at Bipolo on 17 March 2010 (N. Brickle *in litt.* 2010). Red-legged Crake is known from the Lesser Sunda Islands of Flores, Alor and Kisar (White & Bruce 1986). On Flores it is a breeding resident, but it is thought to have resident, migratory and dispersive populations throughout its South-East Asian range (Taylor & van Perlo 1998). Although it might possibly have been overlooked in the past, it is probably more likely to be a wet-season breeding visitor to Timor (N. Brickle *in litt.* 2010).]

White-breasted Waterhen *Amaurornis phoenicurus*

The widespread Wallacean subspecies (Sulawesi, parts of Maluku and Lesser Sundas) is *leucomelanus*, but the Timor/Nusa Tenggara bird has much more extensive grey on the flanks with white restricted to a central area of the chest, and more extensive grey on the head and cheek (compared to birds elsewhere). Plates in fieldguides (Coates & Bishop 1997, Trainor *et al.* 2007b) show the Sulawesi bird which, although currently included with the Timor/Lesser Sunda subspecies, appears closer in appearance to populations on Java. Hartert (1904) clarified subspecific differences for Indonesian populations and included Sulawesi and west Nusa Tenggara populations up to Sumbawa as *phoenicurus*, with *leucomelanus* listed only for Flores, Timor, Wetar, Romang and Tukangbesi Islands. This taxonomic treatment by Hartert (1904) does appear to better represent plumage variation. Breeding records include: adult birds with two chicks at a dam near Nenas on 14 March 2010 (N. Brickle *in litt.* 2010); a fledgling at Irasequiro bridge on 18 April 2003, and also on 30 May 2005, and a fledgling videoed at Anartutu-Atauro Island (650 m), feeding on drying corn on 21 April 2005. Other high-elevation records were at Mount Legumau (1,000 m) and Nenas (West Timor) at 1,760 m (recorded to 2,000 m in south-west India: Taylor & van Perlo 1998).

[Baillon's Crake *Porzana pusilla*

One bird was observed briefly at the edge of Lake Welenas on 14 June 2005. It had a greyish chest and brown upperparts and its identity was confirmed from plates in field guides, but no other details were noted down at the time of the observation. The broad colour patterning and small size does not fit with other rails known from Timor. Regionally it is known from Bali (first island record on 31 March 1995), Flores, Sumbawa (first record on 25 October 1996), Seram and Sulawesi (Mason 1996, Coates & Bishop 1997, Trainor

et al. 2006). An immature bird recorded from North Sulawesi in June was moulting flight feathers and was assumed to have bred locally (White & Bruce 1986). The Flores population is probably the migrant subspecies *pusilla*, as assumed for other Indonesian records based on dates and a few specimens (Taylor & van Perlo 1998, Mees 2006). The date of the Timor observations indicates that it is likely to be resident, although migrant birds in the Malay Peninsula remain until late May or June (White & Bruce 1986). A Timor population would comprise either *pusilla*, or the Australasian *palustris*, which occurs widely in Australia and eastern New Guinea (Taylor & van Perlo 1998).]

[Spotless Crake *Porzana tabuensis*

The bird killed by hunters mentioned in Trainor (2005a) had the following measurements (in mm): bill 18, tarsus 30, wing 71.5, body (excluding tail) 117. The wing length is substantially smaller than male or female birds from Australia, and from New Guinea, but the bill fits within the range of Australian birds (16.2–22.2 mm), but is smaller or slightly larger than New Guinea subspecies (*edwardi* = 19–22 mm, *richardsoni* = 15–17; Taylor & van Perlo 1998). Previously, this crake was known only from the Fuiloro plateau (340–420 m) in Timor-Leste (Trainor 2005a), but it has now been recorded from 35–420 m.]

Common Coot *Fulica atra*

Previously this bird was considered as a 'rare vagrant' (Coates & Bishop 1997) to Wallacea, or as a regular visitor to Timor-Leste (Trainor 2005a) but there is a resident breeding population in Timor-Leste. An adult with three juveniles was seen along the Irasequiro River on 3 October 2004, and seven juveniles were seen at the same site on 8 October 2004. The subspecies is presumably *australis*.

Godwits *Limosa* spp.

A high count of 100–150 godwits were observed at Olio River on 26 September 2010, dominated (c. 95%) by Bar-tailed Godwit *Limosa lapponica*, with at least one Near Threatened Black-tailed Godwit *L. limosa* noted. Up to 188 Black-tailed Godwit were observed at the same site by Andrew (1986) on 30 September 1985. Although data are sparse, there appears to have been a substantial decline of this bird, and other waders such as Curlew Sandpiper *Calidris ferruginea* at this site.

Little Curlew *Numenius minutus*

Three recent records only during September and November confirm that this bird stages in small numbers in Timor-Leste for brief periods while on passage. The highest count was seven birds at Secal estuary on 19 November 2006. One was observed at Laga on 15 November 2005 (A. Black *in litt.* 2010). At Olio River, 24 birds were photographed on 26 September 2010. Other recent Wallacean records include observations of larger groups at airfields: 40 on Kai Besar (Mauro 1999), 40 on Yamdena in Oct 2008 (van Biers 2008) and 50–70 at the airport at Kai Besar in October 2010 (B. Demeulemeester *in litt.* 2010).

Eurasian Curlew *Numenius arquata*

Near Threatened. The first record from Timor-Leste was of one bird at Tibar aquaculture on 5 April 2008. It was separated from Far Eastern Curlew *N. madagascariensis* by its white rump and lower back, which was readily seen when the bird flew off. Far Eastern Curlew is regular at this site, but has a brown rump and lower back. The first Timor Island records were of one and two birds in Kupang Bay during September and October (Andrew 1986). Only eight Wallacean records were reviewed recently (Schellekens 2009) with the omission of a record of two birds on the Gili islands off Lombok (Boon 1996). There is one confirmed Australian record (www.tonypalliser.com/barc/summaries/SUMM545.htm).

Terek Sandpiper *Xenus cinereus*

Previous Timor-Leste records were during southward migration (September–November) but recent records (up to 11 birds) in January, February, March and May indicate that small numbers overwinter, with a particularly late record (23 May at Tibar aquaculture) either a bird on return migration or oversummering. During 2002–2004 all Timor-Leste records were from the period of southward migration (Trainor 2005a) but they have been recorded in Wallacea during all months (Coates & Bishop 1997). At Kupang Bay, 28 birds were noted on 15 December 2004, and about 15 birds were present on 26 September 2010.

[Asian Dowitcher *Limnodromus semipalmatus*

Near Threatened. There have been two recent records of this rare visitor. Colleagues observed one at Tasitolu on 11 and 14 September 2005 (A. Black *in litt.* 2009), and one bird was seen on the beach south of Iliomar, Lautem district (8°45'19"S 126°49'43"E) on 14 December 2005 (P. Leitão, *in litt.* 2010). These are the seventh and eighth Wallacean records (Trainor 2005a, Tebb *et al.* 2008, Schellekens 2009).]

Great Knot *Calidris tenuirostris*

Vulnerable. There were eight records of either one or two birds from September to 29 March, including two birds (presumably always the same) at Tasitolu from 3–16 November 2006. Nine Great Knot were present at Lake Tasitolu on 23 September 2010 (J. D. Pilgrim *in litt.* 2010), confirming the relative rarity of this bird on Timor. A photograph of a bird at Vero River estuary on 22 October 2006 is published in Trainor *et al.* (2007b:50).

Red-necked Stint *Calidris ruficollis*

A bird observed at Lake Tasitolu on 7 May 2005 (in breeding plumage), with an orange flag on the left tarsus, was originally banded in Westernport Bay, Victoria, 3,812 km to the south (C. Minton, Australasian Wader Studies Group, *in litt.* 2010). Recent high counts at Kupang Bay include 252 birds on 12 June 2004 and 350 on 15 December 2004. A total of about 550 birds were counted at Bipolo-Panmuti (West Timor) on 6 September 2010 (C. Robson *in litt.* 2010).

Sharp-tailed Sandpiper *Calidris acuminata*

The 112 birds observed at Bipolo-Panmuti on 6 September 2010 is the highest recent count for Timor (C. Robson *in litt.* 2010). Up to 25 birds have been recorded in Timor-Leste (Trainor 2005a).

Curlew Sandpiper *Calidris ferruginea*

An uncommon passage migrant in Timor-Leste with up to four birds on coastal wetlands. Records of 29 birds at Kupang Bay on 12 June 2004 (Trainor 2005a), and of one bird at Lake Laga on 16 June 2006, indicate that small numbers occasionally oversummer. Wallacean records range from August–April, and June (Coates & Bishop 1997) but there are few records outside the period of southward migration. A recent high count of 80 birds was observed at Bipolo-Panmuti on 6 September 2010 (C. Robson *in litt.* 2010), where up to 450 birds were recorded in the 1980s (Andrew 1986).

Broad-billed Sandpiper *Limicola falcinellus*

Single birds only at Lake Tasitolu on 20 December 2005 (P. Leitão *in litt.* 2010), 22 September 2006 and 3 November 2006 confirm that this is one of the rarest migrants visiting Timor-Leste. The 36 birds observed at Kuka-Panmuti on 5 January 2005 is the highest Timor count (Trainor 2005a). One bird was observed at Bipolo-Panmuti on 6 September 2010 (C. Robson *in litt.*).

Ruff *Philomachus pugnax*

The first Timor-Leste records were at Lake Tasitolu from 28 August

2006 (an adult male) through to 14 November 2006, with one record at the former Dili Helicopter pad (now developed into the offices of the Ministry of Foreign Affairs and Cooperation). There were further Lake Tasitolu records: one bird on 19 November 2005 at Tasitolu (A. Black *in litt.* 2009) and three on 20 December 2005 (P. Leitão *in litt.* 2010). Ruff is a rare but regular visitor to the region (Verbelen 1995, Mauro 1999, Schellekens 2009).

Greater Painted-snipe *Rostratula benghalensis*

The only recent record (2005–2010) was of a female flushed from an irrigated ricefield at Secal on 20 September 2005. Since 2002, all seven records have occurred during the typical migrant season (August–April) except the one bird flushed at Irasequiro River on 24 May, which is relatively late. It might indicate that some birds oversummer, or that there is a resident population on Timor. Based on distribution this bird has been assumed to be the Asian taxon, but photos or a specimen would be valuable to confirm that it is not the recently recognised Australian Painted-snipe *R. australis* (Baker *et al.* 2007).

Black-winged Stilt *Himantopus himantopus*

The previous report of breeding at Kupang Bay, West Timor (Trainor 2005a), omitted any detail. This observation was of two brown-winged fledglings on 12 June 2004 with light cream nape. Juvenile birds had been previously noted nearby (Verbelen 1996). Records of juveniles were highly seasonal between September and January (Figure 2a), and these have either bred locally on Timor (there was also unconfirmed evidence of breeding at Lake Be Malae and Lake Iralalero) or neighbouring islands. In northern Australia this species breeds after the wet season, and there is no information that birds fly north. The Australasian form *leucocephalus* occurs as a breeding bird (?visitor) as far west as Sumatra (Iqbal 2008).

Grey Plover *Pluvialis squatarola*

The c.350 birds roosting at Olio River on 6 January 2005 is the largest recent count for Timor island.

[Kentish Plover *Charadrius alexandrinus*

The first Timor-Leste record was of one bird observed and sketched at Tasitolu on 20 September 2005 (A. Black *in litt.* 2009, corroborated by J. Cox *in litt.* 2009) and the second Timor record following an observation at Kupang Bay (McCrie 1995).]

Javan Plover *Charadrius javanicus*

Near Threatened, new island record. At Tibar Aquaculture, one and three birds were observed on 19 and 21 September 2009, and at least one adult male and one adult female was present on 4 and 9 May 2010 (Plate 1). At least four birds were present at Tibar on

Plate 1. A male Javan Plover *Charadrius javanicus* in breeding plumage at Tibar aquaculture on 9 May 2010. Photo: C. R. Trainor





Plate 2. A juvenile Javan Plover *Charadrius javanicus* at Tibar aquaculture on 31 July 2010. Note downy feathers on nape; in life this bird showed a light rufous wash on the 'collar'. Photo: C. R. Trainor

31 July 2010, including a recently fledged bird with downy feathers still visible on the nape (Plate 2). Substantial new distributional information has been collected on this species, formerly often included with Kentish Plover *C. alexandrinus*. There are breeding populations on Sumbawa (under Kentish Plover: Coates & Bishop 1997), Sumba and Sulawesi, and new distributional records for Sumatra, Flores and Lombok (Tebb *et al.* 2008, J Eaton, I. Londo and M. Schellekens *in litt.* 2010, CRT unpubl. data). The Timor-Leste birds appear to be recent colonists, and are unlikely to have been overlooked since 2002.

Red-capped Plover *Charadrius ruficapillus*

One bird was rescued from a leg snare (used by local boys to catch Spotted Dove *Stigmatopelia chinensis*) at Tasitolu on 6 November 2003. Red-capped Plover breed throughout most of the year, perhaps particularly in the dry season (Figure 2b). Birds breed successfully at Tasitolu, but many nests are destroyed (Olsen & Trainor 2005). Two days (6 September 2005) after a nest with two eggs was found at Lake Tasitolu, there was no trace of the eggs and presumably they had been eaten by pigs or other predators.

Masked Lapwing *Vanellus miles*

New Island Record. In 2005, there were five Timor-Leste records including photos and video and two West Timor records of 2–13 birds during June, August, September and October, indicating that there are occasional dry season visitors from Australia to Timor and as far as Flores (Trainor *et al.* 2009).

Oriental Pratincole *Glareola maldivarum*

There are only three recent records, but this includes observations of about 100 birds hawking over the Baucau plateau on 18 November 2005 (A. Black *in litt.* 2009) and 10 December 2005 (P. Leitão *in litt.* 2010), providing further evidence of the importance of Wallacean islands as stopover sites for this Palearctic migrant (Trainor 2005a).

Australian Pratincole *Stiltia isabella*

A regular visitor with highest counts of 150 birds at Lake Laga (24 May 2005) and 100 birds at Loes River estuary (21 May 2005). About 3,000–5,000 are crudely estimated to visit Timor-Leste during most years, and an estimated 10,000 birds have been recorded

at Kupang Bay, West Timor. The number of birds declines steadily through the dry season (Figure 2c).

Gull-billed Tern *Gelochelidon nilotica*

Gull-billed Tern was first recorded for Timor at Secal estuary on 28 October 1973, but without comment on subspecific identity (McKean *et al.* 1975). At Kupang Bay, 64 of 82 birds were in breeding plumage on 1 October 1985, and these were 'presumably visitors from Australia' (Andrew 1986). Recent publications have highlighted the differences between the Australian resident subspecies *macrotarsa* and Asian migrant *affinis* (Rogers 2004, Rogers *et al.* 2005). These are probably distinct at the species level, but genetic work has not yet been done (D. Rogers *in litt.* 2010). At Olio River, Kupang Bay, on 26 September 2010 about six *macrotarsa* (Plate 3) and at least one *affinis* (Plate 4) were present. The very pale upperparts and long bill with negligible gonydeal angle characterises these birds as *macrotarsa* rather than *affinis* (D. Rogers *in litt.* 2010). These are the first confirmed records for *macrotarsa* outside Australia. The Asian subspecies *affinis* showed a tiny black spot behind the eye (*macrotarsa* shows extensive black behind and in front of the eye in non-breeding plumage), and a rather different bill shape, shorter and straighter than *macrotarsa* (Plate 4) with a stronger gonydeal angle. They are also smaller than *macrotarsa*, with subtly darker upperparts. The *macrotarsa* at Olio River were in breeding plumage and performed displays with fish in their bills, suggesting that they may breed at the site. Observations and photos

Plate 3. A Gull-billed Tern *Gelochelidon nilotica* subspecies *macrotarsa* in breeding plumage, at Kupang Bay on 27 September 2010.



Plate 4. A Gull-billed Tern *Gelochelidon nilotica* subspecies *affinis*, at Kupang Bay on 27 September 2010. Both photos: C. R. Trainor



of straight-billed Gull-billed Terns in Timor-Leste during 2009 were *affinis* (D. Cook *in litt.* 2010), and this subspecies was also photographed near the coast at Bipolo-Pariti, West Timor, in July 2010 (J. Eaton *in litt.* 2010). About 40 Gull-billed Terns were present at a roost at Olio River on 6 January 2005, and a total of 6–15 birds have been recorded at Bipolo-Panmuti during August–September visits in 2007, 2008, 2009 and 2010 (C. Robson *in litt.* 2010). A bird collected from nearby Luang Island was *affinis* (White & Bruce 1986) as was a bird photographed by CRT at nearby Leti Island on 25 September 2008 (M. Carter *in litt.* 2010). Timor records span June to January (Figure 2d).

Little Tern *Sterna albifrons*

A cosmopolitan tern which is represented by subspecies *sinensis* in South-East Asia and Australasia. There were 27 breeding records from 21 May to 5 November (12 records of breeding birds in May and June) at estuaries and saline mudflats along the north coast of Timor, with breeding from June to November at Lake Laga (Figure 2e). The only December record was of a bird feeding over coral reefs at Atauro Island (Trainor & Leitão 2007). However, they are clearly not resident at any location and their status on Timor is unclear. Australian Little Tern breed during the austral summer, so presumably the Timor birds are breeding visitors from Asia. Two

specimens collected on Timor by Muller in 1829 are listed as migratory *S. a. pusilla* (van den Hoek Ostende *et al.* 1997), which is usually included with subspecies *sinensis*. Little Tern was recorded up to 400 m at inland wetlands in Timor-Leste.

White-winged Tern *Chlidonias leucopterus*

Since 2002 there have been only seven records (of 1–6 birds) of this migratory tern from 11 October to 11 November, with a record of a bird in breeding plumage at Tasitolu on 22 May 2005. It is probably frequently overlooked.

Little Grebe *Tachybaptus ruficollis*

Appears to breed throughout the year (Fig. 2e). A bird sat on a nest (on top of reeds) with a single egg at Lake Veihoorana on 25 April 2005. Observed from sea level to 2,100 m in Timor-Leste.

Australasian Grebe *Tachybaptus novaehollandiae*

The subspecies is presumably *novaehollandiae*. Two birds at Lake Eraulo (1,190 m) on 24 September 2005 (R. Safford verbally 2010) and one bird at Lake Iralalalo on 26 October 2006 were the only recent records in Timor-Leste. Seemingly rare, but a spotting scope is needed on larger lakes to discriminate the yellow-eyed *T. novaehollandiae* from the much commoner dark-eyed Little Grebe

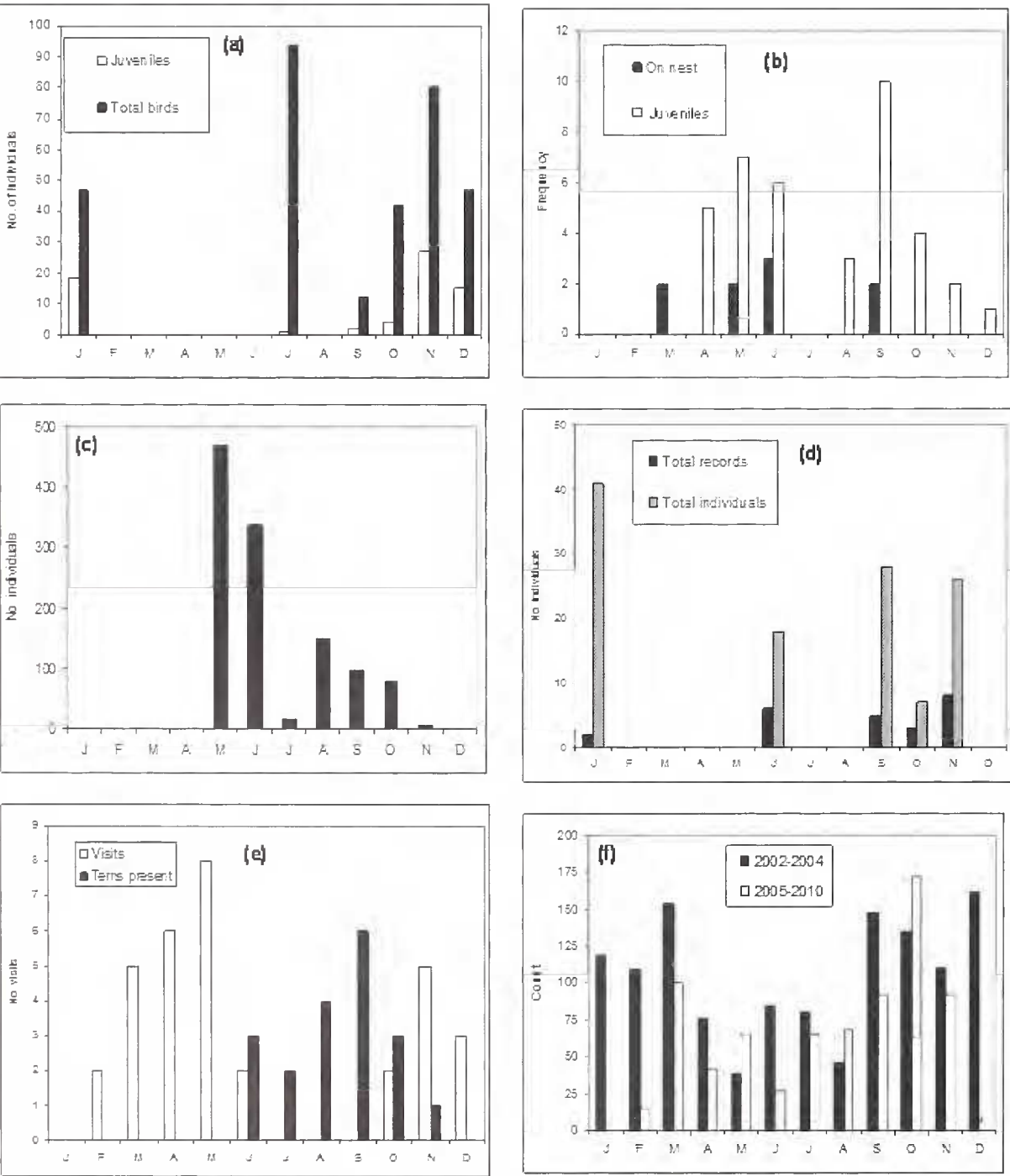


Figure 2. Seasonal patterns of abundance or breeding among selected waterbirds and coastal seabirds with records pooled for months since 2002. (a) Seasonal records of adult and immature-plumaged Black-winged Stilt *Himantopus himantopus* when both recorded together. (b) Reproductive pattern (nests, and runners and fledglings combined) of Red-capped Plover *Charadrius ruficapillus*. (c) Seasonal patterns in the abundance of Australian Pratincole *Stiltia isabellae* throughout Timor-Leste. (d) Records and total number of individuals of Gull-billed Tern *Gelochelidon nilotica* recorded in Timor-Leste and West Timor. (e) Incidence of Little Tern *Sterna albifrons* at Lake Laga during 47 visits since 2002. (f) Mean counts of Palearctic shorebird migrants at Tasitolu pooled over month for the two survey periods.

T. ruficollis. There was an additional record of one bird at Lake Tilong, near Kupang (West Timor), on 9 June 2010 (M. Schellekens *in litt.* 2010) and new island records for the neighbouring islands of Sermata (4 November 2010) and Leti (an adult bird with four chicks on 13 November 2010) (CRT unpubl. data).

Australasian Darter *Anhinga novaehollandiae*

This bird is often treated as a subspecies within the globally Near Threatened Darter *A. melanogaster* (del Hoyo *et al.* 1992, OBC 2010). In recent Timor literature darter was recognised as a subspecies of the Near Threatened *melanogaster* (Trainor 2005a), or as the Oriental Darter *A. melanogaster* (Trainor *et al.* 2007b) but is clearly the Least Concern Australian species as in Trainor *et al.* (2008). In Wallacea, *melanogaster* has been recorded on Sulawesi, Banggai and Sumbawa, while *novaehollandiae* was listed for Babar, Timor, and probably Seram and Halmahera (Coates & Bishop 1997). The estimate of 200 birds at Lake Modo Mahut on 12 June 2005 is the highest count for Wallacea.

Little Pied Cormorant *Phalacrocorax melanoleucos*

A pair of birds sat on a stick nest at Lake Iralalaro on 29 March 2003, and about 100 immature birds were photographed loafing next to Lake Iralalaro at the same time. Previously at this site, locals reported 500–1,000 nests during episodic flooding at Iralalaro (1999–2002). At this time Estuarine Crocodiles *Crocodylus porosus* fed on fallen chicks, and local men entered the water to climb trees and collect eggs and chicks.

Pied Heron *Egretta picata*

An uncommon Australian vagrant or visitor with records from sea level to 330 m. Immature birds with white head and neck were observed 3 km west of Lautem on 16 June 2006, and at Lake Tasitolu on 22 June 2006.

Purple Heron *Ardea purpurea*

Records of six individuals by CRT attributed to this heron in the far east of Timor-Leste are now considered most likely to have been misidentified Great-billed Heron *Ardea sumatrana* (perhaps immature birds). There are two records from Kupang Bay (Trainor 2005a), and this heron is likely in lowland wetlands of Timor-Leste—but not in sea caves along the coast as reported in Trainor (2005a)—these would certainly refer only to Great-billed Heron.

Yellow Bittern *Ixobrychus sinensis*

Observed at four lakes and swamps on 13 April, 30 May, 10–13 June, 2 and 24 August, confirming that it is resident rather than a northern migrant. It was recorded in July 2010 on Sumba (J. Eaton *in litt.* 2010). A bird was also seen adjacent to Ngurah Rai international airport, Bali, on 29 May 2006, suggesting that it is also resident on Bali although previously it has been thought a winter migrant (MacKinnon & Phillipps 1993).

[Von Schrenck's Bittern *Ixobrychus eurhythmus*

A bird observed in flight at Laka Farapata on 28 April 2006 with 'rufous back and grey wings' was thought to be Von Schrenck's Bittern rather than Yellow Bittern *I. sinensis*, which typically shows blackish primaries and yellowish-brown back. There were several further unconfirmed observations of bitterns flushed at O'Swamp with patterning that appeared more like Von Schrenck's Bittern, but perhaps these were confused with Yellow Bittern. There are records of Von Schrenck's Bittern from Talaud, Siau and north and east Sulawesi, where it is thought to be a 'scarce but regular winter visitor' but possibly breeds on Sulawesi (Coates & Bishop 1997). *Ixobrychus* bitterns are poorly known on Timor: most observations have been of flushed birds, observed in flight for less than 1 second, making identification difficult.]

Cinnamon Bittern *Ixobrychus cinnamomeus*

This was considered a breeding resident in Trainor (2005a) without supporting evidence. The first island record was on 9 December 1995 and it was considered a likely vagrant from northern Asia (Noske & Ueda 1996). Of the 29 records since 2002, four have been between 24 May and 2 August (2004, 2005, 2008), which suggests that this bird is more likely to be a resident breeder than a northern migrant.

Australian White Ibis *Threskiornis molucca*

The first record for Timor-Leste was the two adult birds feeding along the Loes River near the estuary on 18 September 2009. The only previous Timor record was of one bird at Kupang Bay on 7 August 1998 (R. Drijvers in Trainor *et al.* 2006). An adult and immature were recorded from Babar Island (200 km east of Timor-Leste) during August and September 1905 (Hartert 1906). Australian birds are strongly migratory (Marchant & Higgins 1993), and appear to reach Timor as rare Austral winter vagrants. There is a resident breeding population on Seram, but otherwise it is infrequently recorded in Wallacea (Coates & Bishop 1997).

Royal Spoonbill *Platalea regia*

Large flocks were observed along the north coast particularly during the dry season at Kuka-Pariti (19 birds on 5 January 2005), Lifao River estuary (at least 18 birds in non-breeding plumage on 15 September 2009), Lake Be Malae (75 birds on 18 June 2005) and Secal estuary (13 birds on 20 September 2005) which suggests the species is probably an austral visitor rather than a local breeder. One bird at Lake Tasitolu on 7 February 2003 was in breeding plumage (white nape-plume). The date of the two specimens collected in Dili mentioned in Trainor (2005a) should have been 17 April 1932, rather than 1931.

Australian Pelican *Pelecanus conspicillatus*

The 123 birds counted at Lake Tasitolu on 21 September 2010 (J. D. Pilgrim *in litt.* 2010) is the highest count for Timor Island. Up to 150–200 birds have been reported from nearby Roti Island (Trainor 2005b). It was considered as an 'irregular visitor' to Wallacea from Australia (Coates & Bishop 1997), but is present year round on Timor.

DISCUSSION

Species status

At least 90 waterbird and coastal seabirds have now been recorded on Timor Island including an unusual mix of typical Asian and Australian forms. Combined with previous data (2002–2004) a total of 86 waterbird and coastal seabirds (5,645 records) have now been recorded in Timor-Leste from 93 sites. This comprises c.99% of geo-coded records available for waterbird and coastal seabirds in the new nation, and could be used as a baseline for broad monitoring of wetlands and associated bird populations.

Some of the most surprising recent Timor Island observations include the discovery of breeding populations of Red-capped Plover, Javan Plover and Red-legged Crake, and the first records outside Australia of the Australian race *macrotarsa* of Gull-billed Tern. Of the listed species only vagrant White-headed Shelduck *Tadorna radjah* and Caspian Tern *Sterna caspia* have not been recorded since 2002. All waterbirds and coastal seabirds listed for the island have been recorded in Timor-Leste with the exception of Red-legged Crake and Purple Heron. Of the migrant shorebirds listed for Wallacea, only the vagrant Nearctic Lesser Yellowlegs *Tringa flavipes* (Schellekens 2006) and Pin-tailed Snipe *Gallinago stenura* are yet to be recorded—or confirmed—for Timor (Coates & Bishop 1997).

Five threatened or Near Threatened Palearctic migrants (Black-tailed Godwit, Eurasian Curlew, Eastern Curlew, Asian Dowitcher and Great Knot) have been recorded in Timor-Leste. None of these is represented by internationally significant counts, and only Eastern Curlew occurs regularly. Three Near Threatened resident waterbirds were listed in Trainor (2005a). Now ignoring darter, Timor-Leste retains good populations of Near Threatened Malaysian Plover *Charadrius peronii* and Beach Thick-knee *Esacus magnirostris*. Both these species are restricted to beach habitat which is highly limited in area, and in Timor-Leste is in great demand for a variety of development projects and livelihood activities. Villages also line much of the coastal strip of the country. The status of the Near Threatened Javan Plover is poorly known, but it presumably prefers saline lake and aquaculture pond habitat, which in Timor-Leste is threatened by development projects (e.g. planned luxury hotel development at Lake Tasitolu).

Key sites

Three sites (Lake Iralalaro, Lake Tasitolu and Lake Laga) were previously highlighted as significant sites for waterbirds and coastal seabirds in Timor-Leste (Trainor 2005a). Kupang Bay (West Timor) remains the single most important site on the island for migratory waders, although wader and tern numbers have clearly declined substantially since the survey by Andrew (1986).

- Lake Iralalaro is best considered as part of a large wetland complex of international significance. The previous review (Trainor 2005a) included 16 wetland sites (of a total of 74) on the Fuiloro plateau (c.440 km²): this high rainfall (1,800–3,600 mm/yr) closed catchment has substantial populations of ducks, rails, darter, egrets, herons and night-herons, and seasonally hosts good numbers of visiting terns and migrant waders, most notably staging Oriental Pratincole and Oriental Plover. In the late dry season up to 4,000–6,000 individual waterbirds and coastal seabirds are present.
- Five sites in the Sungai Clere Important Bird Area (Lake Modo Mahut, Lake Wailenas, Lake Wailada, Sahen River channel and the Lake Naan Kuro lagoon) have now been surveyed, albeit briefly. This extensive complex (422 km²: Trainor *et al.* 2007a) appears to have nationally significant populations of ducks, rails, darter, probably bitterns and night-herons, but further survey work is essential.
- Lake Tasitolu has been visited on more than on 163 occasions since 2002. This is the most important saline lake for migrant shorebirds in Timor-Leste. Combined with data from colleagues a total of 60 waterbird and coastal seabirds have been recorded including 30 Palearctic migratory shorebird species. The highest single Palearctic migratory shorebird count has been only 345 birds in December 2003, but more than 100 individual birds are usually present in the migrant season (Figure 2f), with very high turnover.
- The Lifao, Loes and Secal estuaries are the most extensive along Timor-Leste's north coast, and are important sites for migrant shorebirds, resident ducks, breeding Little Tern, Beach Thick-knee, Malaysian Plover and Royal Spoonbill.

Suggestions for further study

More detailed surveys are needed for Lake Iralalaro and the Fuiloro plateau complex, and in the Sungai Clere region of Timor-Leste. The Kupang Bay area in West Timor also needs further attention. The taxonomic and residence status remains poorly known or unclear for many species. Further study of the taxonomic status of the following bird species or bird groups would be valuable: Yellow Bittern, Red-capped Plover, Greater Painted-snipe and *Gallinago* snipes, Gull-billed Tern, and Little Tern; and further study of the residence status of the following species would be of value: Royal Spoonbill, Cinnamon Bittern, Yellow Bittern,

Javan Plover, rails in general (but particularly Red-legged Crake, Spotless Crake and Baillon's Crake), Greater Painted-snipe and Little Tern.

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Appendix 1
New site records for waterbirds and coastal seabirds (n= 70 species) during 2005–2010

For site numbering and other details refer to Appendix 1: Trainor 2005a, and Table 1. Site records during 2002–2004 for Green Pygmy Goose, Terek Sandpiper and Curlew Sandpiper were omitted from Appendix 1 of Trainor (2005a) and are here included in square brackets.

Species	New sites	Species	New sites
Wandering Whistling-duck <i>Dendrocygna arcuata</i>	2, 77, 83	Common Sandpiper <i>Actitis hypoleucos</i>	28, 75, 76, 77, 87, 92
Green Pygmy Goose <i>Nettapus pulchellus</i>	[57, 65] 29, 63	Grey-tailed Tattler <i>Heteroscelus brevipes</i>	5, 6
Pacific Black Duck <i>Anas superciliosa</i>	29, 31, 40, 75, 81, 93	Ruddy Turnstone <i>Arenaria interpres</i>	11, 16, 31, 34, 35, 48, 49
Sunda Teal <i>Anas gibberifrons</i>	6, 48	Asian Dowitcher <i>Limnodramus semipalmatus</i>	13
Hardhead <i>Aythya australis</i>	2, 8, 14, 63	Great Knot <i>Calidris tenuirostris</i>	11, 48, 49, 69, 75
Buff-banded Rail <i>Gallirallus philippensis</i>	34, 57	Sanderling <i>Calidris alba</i>	35, 49
White-breasted Waterhen <i>Amaurornis phaeiurus</i>	43, 49, 78, 82, 83, 84, 92	Long-toed Stint <i>Calidris subminuta</i>	2, 11, 16, 28, 31
Spotless Crake <i>Parzana tabuensis</i>	84	Sharp-tailed Sandpiper <i>Calidris acuminata</i>	28, 45, 75
White-browed Crake <i>Parzana cinerea</i>	84	Curlew Sandpiper <i>Calidris ferruginea</i>	[5, 11, 13, 34] 16, 31, 35
Purple Swampphen <i>Parphyria parphyria</i>	84	Ruff <i>Philomachus pugnax</i>	13, 18
Dusky Moorhen <i>Gallinula tenebrasa</i>	84	Red-necked Phalarope <i>Phalaropus lobatus</i>	13, 16
Common Coot <i>Fulica atra</i>	63	Greater Painted-snipe <i>Raistratula benghalensis</i>	34
Swinhoe’s Snipe <i>Gallinago megala</i>	82	Beach Thick-knee <i>Esacus neglectus</i>	29, 40, 45
Bar-tailed Godwit <i>Limasa lappanica</i>	34, 35	Black-winged Stilt <i>Himantopus himantopus</i>	28, 48, 63, 77
Little Curlew <i>Numenius minutus</i>	34	Pacific Golden Plover <i>Pluvialis fulva</i>	16, 23, 40, 48, 75, 80
Whimbrel <i>Numenius phaeopus</i>	10, 40, 49, 87	Grey Plover <i>Pluvialis squatarala</i>	34, 45
Eurasian Curlew <i>Numenius arquata</i>	11	Red-capped Plover <i>Charadrius ruficapillus</i>	28, 75
Common Greenshank <i>Tringa nebularia</i>	16, 75, 85, 88	Javan Plover <i>Charadrius javanicus</i>	11
Wood Sandpiper <i>Tringa glareola</i>	28, 31, 40, 75, 79, 91	Malaysian Plover <i>Charadrius peranii</i>	11, 23, 90
Terek Sandpiper <i>Xenus cinereus</i>	[11, 13, 34, 45] 20, 31	Lesser Sand Plover <i>Charadrius mangalus</i>	24, 49, 90

Species	New sites	Species	New sites
Greater Sand Plover <i>Charadrius leschenaultii</i>	24, 69, 75	Little Egret <i>Egretta garzetta</i>	6, 28, 29, 40, 49, 77, 83, 87, 88
Masked Lapwing <i>Vanellus miles</i>	5, 27, 28, 65	Pacific Reef Egret <i>Egretta sacra</i>	16, 24, 31, 86
Oriental Plover <i>Charadrius veredus</i>	5, 60, 80, 89	Pied Heron <i>Egretta picata</i>	28, 48, 63
Australian Pratincole <i>Stiltia isabella</i>	5, 28, 33, 48, 56, 60, 63, 75, 77, 79, 85	Great-billed Heron <i>Ardea sumatrana</i>	69, 73, 74, 86
Great Crested Tern <i>Sterna bergii</i>	24, 49, 90	Great Egret <i>Casmerodius albus</i>	6, 48, 63, 77, 78, 83, 84
Common Tern <i>Sterna hirunda</i>	69	Intermediate Egret <i>Mesophayx intermedia</i>	28, 30, 63, 76
Little Tern <i>Sterna albifrons</i>	40, 75	Cattle Egret <i>Bubulcus ibis</i>	8, 63, 77
Whiskered Tern <i>Chlidanias hybridus</i>	6, 29, 75	Little Heron <i>Butarides striatus</i>	29, 83, 84
White-winged Tern <i>Sterna leucapterus</i>	20	Black-crowned Night Heron <i>Nycticarax nycticarax</i>	29, 83, 84
Little Grebe <i>Tachybaptus ruficollis</i>	35, 48, 81	Rufous Night Heron <i>Nycticarax caledanicus</i>	28
Australasian Grebe <i>Tachybaptus novaehollandiae</i>	8	Yellow Bittern <i>Ixobrychus sinensis</i>	83, 84
Australasian Darter <i>Anhinga novaehollandiae</i>	10, 40, 45, 78, 83, 84	Cinnamon Bittern <i>Ixobrychus cinnamomeus</i>	8, 56, 84
Little Pied Cormorant <i>Phalacrocorax melanoleucas</i>	11, 34, 49, 75, 83	Australian White Ibis <i>Threskiornis malacca</i>	5
Little Black Cormorant <i>Phalacrocorax sulcirostris</i>	24, 63, 75, 83	Royal Spoonbill <i>Platalea regia</i>	29, 34, 48, 75
White-faced Heron <i>Egretta novaehollandiae</i>	13, 19, 31, 48, 77, 80	Australian Pelican <i>Pelecanus conspicillatus</i>	2, 9, 31, 63